



A CLOSURE FOR A BOTTLE OR OTHER CONTAINERS, AND A METHOD FOR MANUFACTURING SAME

This invention relates to a bottle closure to be put onto a water dispenser, and a method for manufacturing such a closure for bottles or other containers.

A plastic cap-and-plug for a bottle is known comprised of a hollow plug with a closed bottom and a cylindrical cap having a cover provided with a coaxial through stub pipe leading inside a cylindrical lateral part of the cap, and forming an entity together with that lateral part of the cap. Said plug, and said cap are connected one to another by their snap action. On said lateral cylindrical part of a cap a small channel is formed reducing a cross section and extending around the cap perimeter till a belt grip.

From the US patent 5,392,939 a closure is also known for bottles or other containers to be mounted onto a stub pipe of a receiving valve or a liquid receiving means.

A plastic closure is comprised of a cylindrical cap, a cover of which has a downward directed coaxial cylindrical stub pipe onto which there is snap mounted a plug having a shape of a dish with an outside ring flange forming a circular cavity.

The known methods for manufacturing a closure for containers consisted in that a cap was made by injection forming, and a plug was made separately, and then these parts were snap connected together. Separate injection molds were used in that method.

A plastic closure consisted of a cylindrical cap with a belt grip, said cap having an inside directed coaxial cylindrical stub pipe, and of a hollow cylindrical plug is according to the invention characterized in that said cylindrical plug is connected to a cylindrical stub pipe of a cap by means of a breakable means, advantageously in form of a circular connecting film. This circular connecting film is located at the end of the cylindrical stub pipe of the cap. The cylindrical plug has a circular flange situated above the bottom. A belt grip of a cap has inside a stiffening bead formed of horizontal beads connected by a lateral vertical bead.

A method for manufacturing a closure for bottles or other containers according to the invention is characterized in that a cylindrical plug having a circular flange located above a plug bottom together with a cylindrical cap are formed by injection in an injection mould, wherein after injection a forming male die is put in motion in relation to a forming plate in order to release the outer cylindrical surface of the cap, and an ejector supporting the bottom of the cylindrical plug is simultaneously slid so that when the cylindrical cap is finally released from an injection mould, connected by a connecting film, an ejecting sleeve and an ejector are working simultaneously, and afterwards the closure is blown with compressed air in order to achieve its reliable ejection from the injection mould.

It is easy and comfortable to use the closure according to the invention. In a moment of putting a bottle onto a water dispenser a connecting film is reliably broken as a safety seal, and at the same time the seal of a container is better.

A method according to the invention is simple in realization, and ensures releasing the entire cap and plug from an injection mould.

An embodiment of the invention is shown in the drawings, where Fig. 1 is a closure in its vertical section, Fig. 2 is an enlargement of a cap fragment in a vertical section showing a plug connected with a stub pipe of a cap by means of a connecting film, Fig. 3, Fig. 4, and Fig. 5 depict successive phases of the operation of the injection mould in a vertical projection partially in cross-section.

A plastic closure consists of a cylindrical cap 1 and a hollow cylindrical plug 2. The cylindrical cap 1 has a coaxial cylindrical stub pipe 3 directed inside it, as well as a tangential to its outer surface belt grip 5, having at its inner side stiffening horizontal beads connected laterally by means of a vertical bead. The cylindrical plug 2 has circular flange 7 above its bottom 8, and it is connected to the stub pipe 3 of the cap 1 by means of a breakable means in form of a circular connecting film 4 situated at the end of the stub pipe 3 of the cap 1.

A method for manufacturing a closure is characterized in that the cylindrical plug 2 having an circular flange 7 located above the bottom together with the cylindrical cap 1 are formed by injection in an injection mould.

This method consists in that after injection the mould is opened at the separation place I shown in fig. 3, the face surface of the cylindrical cap 1 and the inner part of the cylindrical plug 2, and at the same time the plate 11 together with the forming male die 12 connected to it are pulled by means of the pulling rod. The pulled plate 11 together with the forming male die 12 connected to it release the cylindrical outside surface of the cap 1 formed in the plate 16. Moreover, the pulled plate 11 shown in Fig. 4 together with the forming male die 12 connected to it push the ejecting sleeve 13 which enables the simultaneous movement II (shown in Fig. 3) thanks to the element 18 connecting with a ejecting plate 10. Such a simultaneous movement of the ejecting plate 10 together with the plate 11 makes it able the ejector 17 to be moved simultaneously with the forming male die 12, and to support the bottom

8 of the cylindrical plug 2. The bottom 8 is supported by the ejector 17 in order to protect the cylindrical plug 2 against breaking the connecting film 4. On stopping the plate 11 (shown in Fig. 4) at the moment of touching the forming plate 16 the ejecting plate 10 is stopped too. Now the movement III (shown in Fig. 3) starts brought about by the mandrel 9. The ejecting plate 10 being pulled till begins now to push the ejecting sleeve 13 and at the same time the ejector 17. The movement III (shown in Fig. 3) of the ejecting plate 15 releases by means of the ejecting sleeve 13 (Fig. 5) and the ejector 17 entirely the cylindrical cap 1 and the cylindrical plug 2 from the injection mould.

The closure is additionally blown with compressed air in order to be reliably ejected from the mould. The injection mould to be used in this method shown in its embodiment in the drawing consists of the mandrel 9, ejecting plate 10, plate 11, forming male die 12, ejecting sleeve 13, base plate 14, pulling rod 15, ejector 17 and the connecting means 18.

### Parts list

- 1 - cylindrical cap
- 2 - cylindrical plug
- 3 - cylindrical stub pipe
- 4 - connecting film
- 5 - belt grip
- 6 - stiffening bead
- 7 - circular flange
- 8 - bottom of a plug
- 9 - mandrel
- 10 - ejecting plate
- 11- plate
- 12 - forming male die
- 13 - ejecting sleeve
- 14 - base plate
- 15- pulling rod
- 16 - forming plate
- 17- ejector
- 18 - connecting means

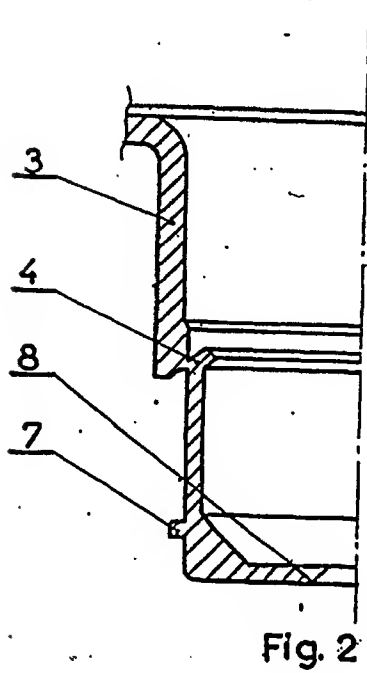
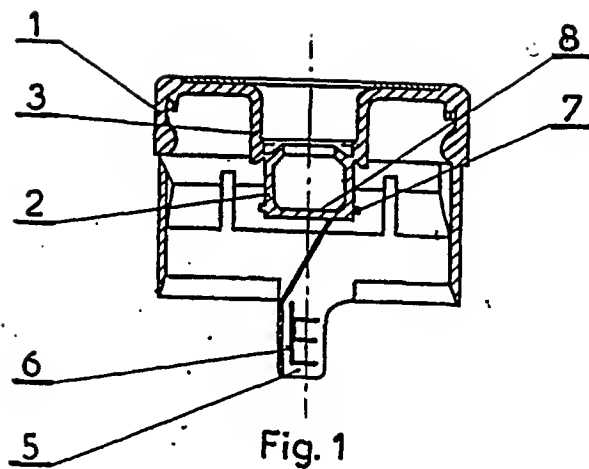
### Claims

1. A plastic closure for bottles and other containers consisting of a cylindrical cap with a belt grip, said cap having a coaxial cylindrical stub pipe directed inside it, and of a hollow cylindrical plug, characterized in that said cylindrical plug (2) is connected with a cylindrical stub pipe (3) of a cap (1) by means of a breakable means, advantageously in form of a connecting film (4).
2. A closure according to Claim 1, characterized in that said circular connecting film (4) is situated at the end of said stub pipe (3) of said cap (1).
3. A closure according to Claim 1, characterized in that said cylindrical plug (2) has an circular flange (7) above the bottom (8).
4. A closure according to Claim 1, characterized in that said belt grip (5) of said cap (1) has at its inner side a stiffening bead (6) formed of horizontal beads connected laterally by a vertical bead.
5. A method for manufacturing a closure for bottles or other containers, characterized in that said cylindrical plug (2) is formed together with a cylindrical cap (1) by injection in an injection mould, wherein after injection a

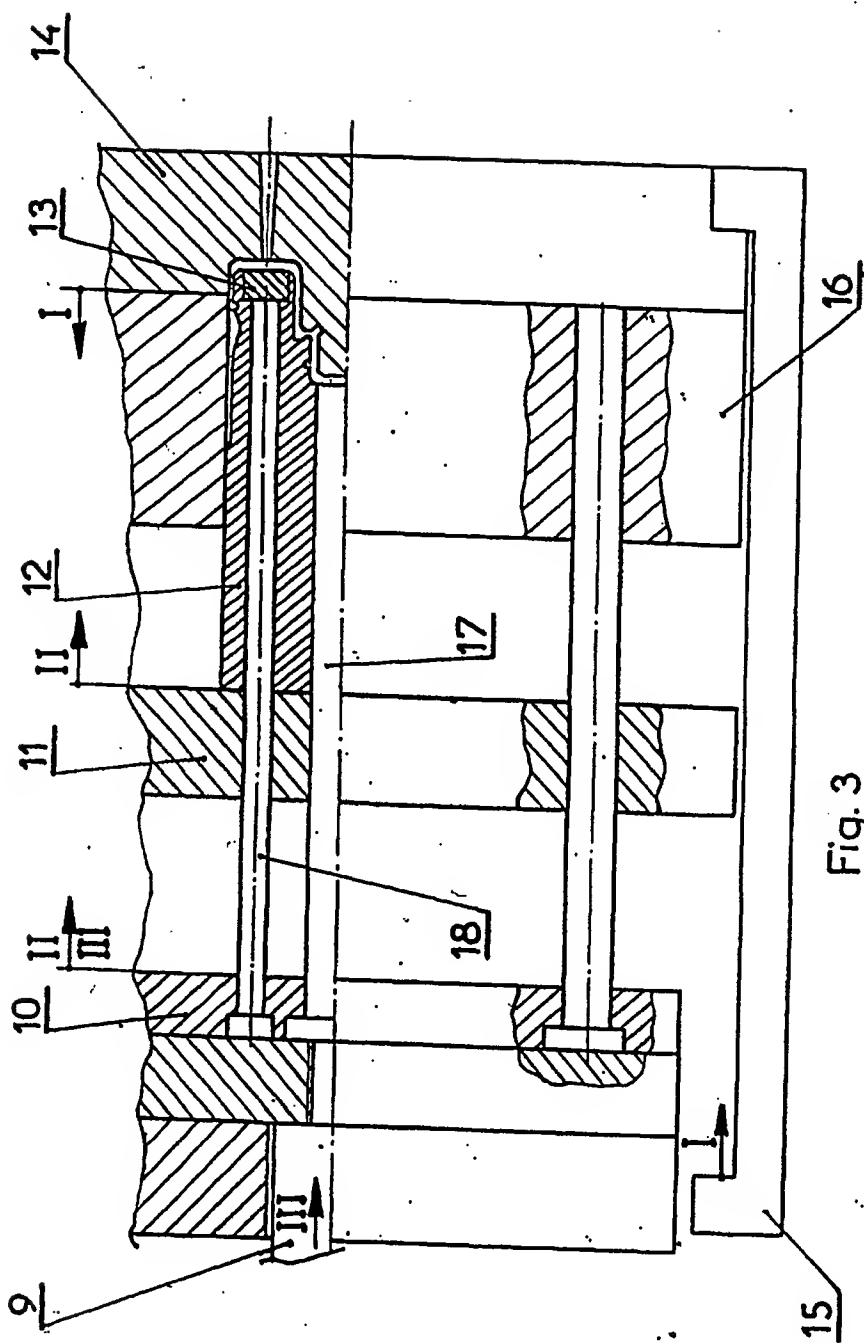
motion of a forming male die (12) is caused in relation to a forming plate (16) to release an outer cylindrical surface of said cap (1), and at the same time an ejector (17) supporting the bottom (8) of the cylindrical plug (2) is slid so as to achieve a simultaneous action of the ejecting sleeve (13) and the ejector (17) when finally releasing from the injection mould the cylindrical cap (1) and the plug (2) connected one to another by means of the connecting film (4), and then the closure is blown with compressed air in order to reliably eject it from said injection mould.

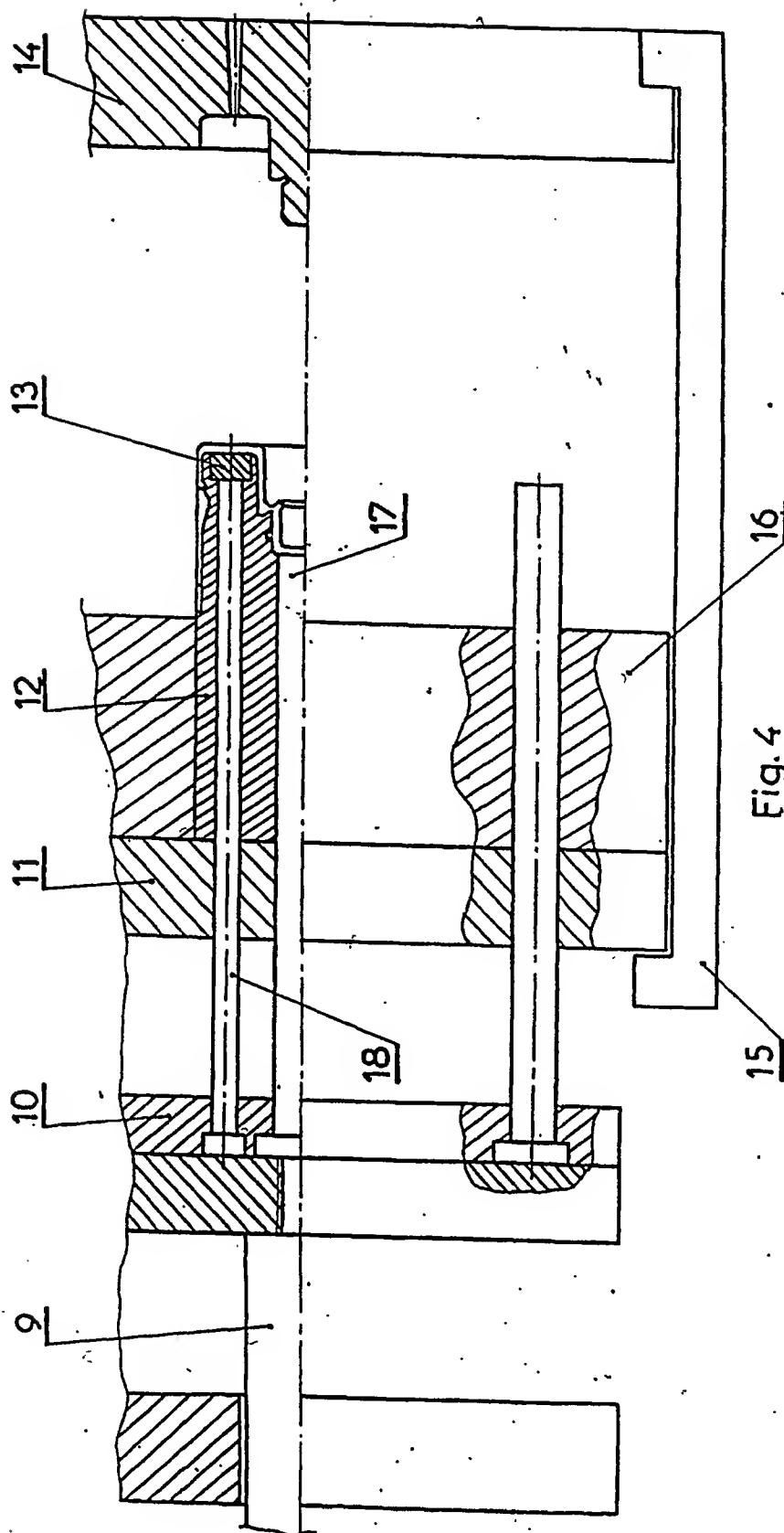


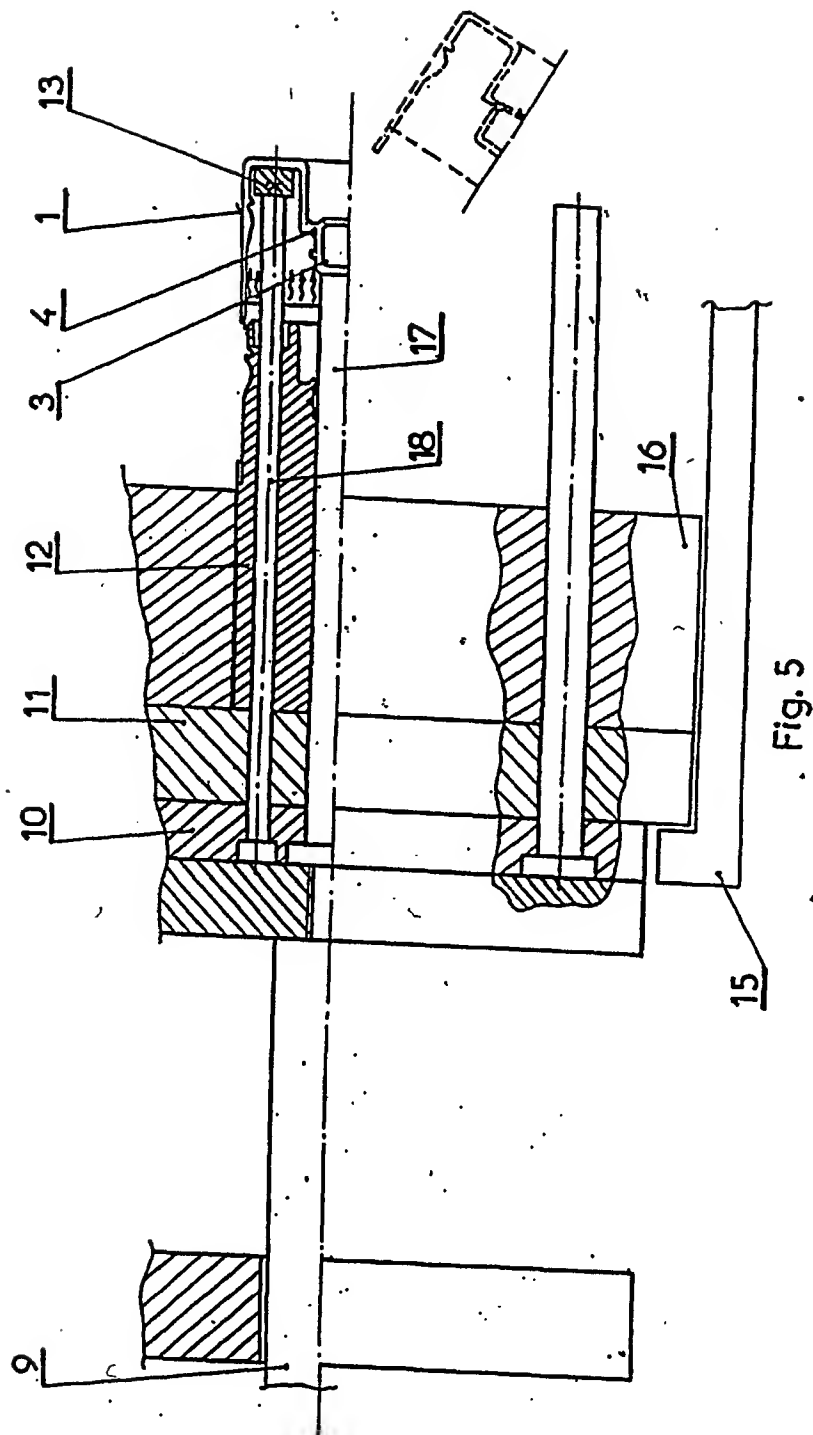
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## INTERNATIONAL SEARCH REPORT

International Application No  
PCT/PL 01/00035

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 7 B67D3/00 B29C45/44 B29C45/43		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) IPC 7 B67D B29C B65D		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, WPI Data		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 273 083 A (BURROWS BRUCE D) 28 December 1993 (1993-12-28)	1-3
Y	column 6, line 67 -column 7, line 32; figures 3,6,9	4,5
Y	WO 91 13813 A (EWIT AG) 19 September 1991 (1991-09-19) page 3, line 35 -page 4, line 6; figures 3,6	4
Y	US 3 940 103 A (HILAIRE FERNAND) 24 February 1976 (1976-02-24) the whole document	5
X	US 5 222 530 A (BAKER HENRY E ET AL) 29 June 1993 (1993-06-29) column 4, line 42 -column 6, line 35; figures 4A,4B,4C	1-3
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<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.		
* Special categories of cited documents : *A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art *Z* document member of the same patent family		
Date of the actual completion of the international search		Date of mailing of the international search report
3 October 2001		10/10/2001
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer  Schneider, M

# INTERNATIONAL SEARCH REPORT

Inter      nal Application No  
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>WO 94 29215 A (PORTOLA PACKAGING INC) 22 December 1994 (1994-12-22) the whole document</p>	1-5

## INTERNATIONAL SEARCH REPORT

Information on patent family members

Intern

al Application No

PCT/PL 01/00035

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5273083	A	28-12-1993	US 5413152 A	09-05-1995
			AU 653067 B2	15-09-1994
			AU 2697692 A	03-05-1993
			AU 672342 B2	26-09-1996
			AU 8048794 A	23-02-1995
			CA 2093006 A1	08-04-1993
			CA 2239918 A1	08-04-1993
			DE 69216387 D1	13-02-1997
			DE 69216387 T2	24-04-1997
			DE 69231256 D1	17-08-2000
			DE 69231256 T2	13-06-2001
			EP 0569584 A1	18-11-1993
			EP 0736454 A1	09-10-1996
			ES 2096278 T3	01-03-1997
			ES 2150617 T3	01-12-2000
			JP 2633730 B2	23-07-1997
			JP 6503538 T	21-04-1994
			KR 239606 B1	15-01-2000
			WO 9307057 A1	15-04-1993
			US 5653270 A	05-08-1997
WO 9113813	A	19-09-1991	CH 683335 A5	28-02-1994
			WO 9113813 A1	19-09-1991
US 3940103	A	24-02-1976	FR 2261937 A1	19-09-1975
			AT 355798 B	25-03-1980
			AT 121075 A	15-08-1979
			BE 825107 A1	29-05-1975
			CA 1033518 A1	27-06-1978
			CH 594532 A5	13-01-1978
			DE 2506551 A1	28-08-1975
			DK 48275 A	20-10-1975
			ES 223591 Y	16-04-1977
			GB 1483711 A	24-08-1977
			IE 40799 B1	15-08-1979
			IT 1030194 B	30-03-1979
			LU 71880 A1	24-06-1975
			NL 7501634 A	25-08-1975
US 5222530	A	29-06-1993	US 5284188 A	08-02-1994
			US 5295518 A	22-03-1994
			US 5289854 A	01-03-1994
			AT 116949 T	15-01-1995
			AT 153618 T	15-06-1997
			AU 617015 B2	14-11-1991
			AU 4405189 A	01-05-1990
			BR 8907712 A	30-07-1991
			CA 1338210 A1	02-04-1996
			CA 1338339 A1	21-05-1996
			DE 68920588 D1	23-02-1995
			DE 68920588 T2	17-08-1995
			DE 68928086 D1	03-07-1997
			DE 68928086 T2	20-11-1997
			DK 145590 A	14-06-1990
			EP 0438451 A1	31-07-1991
			EP 0641713 A1	08-03-1995
			ES 2016533 A6	01-11-1990
			FI 89780 B	13-08-1993

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/PL 01/00035

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5222530	A		GR 89100655 A ,B	29-11-1990
			IL 92114 A	21-02-1993
			IL 99404 A	18-08-1993
			JP 6062195 B	17-08-1994
			JP 3503273 T	25-07-1991
			KR 9611713 B1	30-08-1996
			MX 172394 B	15-12-1993
			PT 91978 A ,B	30-04-1990
			US 5295519 A	22-03-1994
			US 5289855 A	01-03-1994
			WO 9003919 A1	19-04-1990
			US 5121778 A	16-06-1992
			US 5222531 A	29-06-1993
WO 9429215	A	22-12-1994	US 5370270 A	06-12-1994
			AU 7201794 A	03-01-1995
			WO 9429215 A1	22-12-1994